

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

Example: Matrix

The specification discloses a method of performing matrix multiplication using a general purpose computer. No specific computer hardware or software programs are disclosed. The specification recites specific algorithms for manipulating matrices including the multiplication of two matrices together. A flow chart showing the steps involved in creating the rows and columns of the matrix and the multiplication of the terms is provided. The terms of the matrix are disclosed as representing vectors. The vectors could represent data collected from real world objects or they could be abstractions of non physical systems.

The method consists of creating two matrices having terms defined by disclosed mathematical relationships such as being non-zero, and related to a prime number or a factorial of a prime number. After creating the two matrices they are combined into one matrix by interleaving rows and columns until a prescribed mathematical relationship exists. A multiplication of the matrixes then takes place whereby an output result is determined which defines the value(s) for some unknown quantity.

The disclosure provides several examples of possible uses for the method which include simulation of space craft flight paths. The specification mentions that if this method were incorporated into the control environment of a space craft the pilot could use the method to optimize flight paths. No details of how this would be done are recited in the specification but the disclosure complies with the requirements of 35 U.S.C. § 112. The disclosure states that the invention is not limited to the space craft environment.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

Example: Matrix

Claim 1

A processing system for performing a plurality of matrix manipulations comprising:

- a. means for creating a first R-row by C-column sub matrix consisting of an offset diagonal of non-zero terms, each of the R-rows having at least N non-zero terms equal in number to C, where C is a prime number and the sum of the non-zero terms of each row is less than C!;
- b. means for creating a second R-row by C-column sub matrix consisting of an offset diagonal of non-zero terms, each of the R-rows having at least N non-zero terms equal in number to C, where C is a prime number and the sum of the non-zero terms of each row is less than C!;
- c. means for sequentially manipulating the two sub matrices in a manner such that each matrix interleavedly exchanges a row and column until 2R-C exchanges have been made; and
- d. means for matrix multiplying the manipulated matrices; and
- e. means for outputting the result.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS**Example: Matrix****Table for Claim 1**

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	NO	GoTo: Q.9	
BOX 9	Q.9. Is claimed invention a product for performing a process?	YES	GoTo: Q.10	
BOX 10	Q.10. Is claimed invention a specific machine or manufacture?	?	GoTo: Q.12a	Note 3
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 4
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	
	Q.13b. Does process solve math problem w/o limitation to a practical application?	YES	GoTo: END	Note 5

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

Example: Matrix

Table Notes for Claim 1

Note 1: Disclosed invention aids pilots of a space craft in controlling the craft.

Note 2: Disclosed invention uses a computer system to determine the coordinates needed for controlling a space craft.

Note 3: Without a specification, it cannot be determined whether the claimed invention is a specific machine. The means-plus-function limitations must be read in light of the structure disclosed in the specification.

If the claimed invention encompasses any and every machine embodiment of the underlying process, then whether the claimed invention is statutory will be decided in the steps below, *i.e.*, boxes 12 and 13 of the flowchart.

Note 4: Element e. merely conveys the direct result of the computer operations of elements a. through d. *See* Guidelines, Section IV.B.2(d)(iii).

Note 5: Claimed invention is not limited to a practical application. Viewed as a whole, the claimed invention merely multiplies the matrices and outputs the direct result. It does not impart any *function* to the processing system, *i.e.*, the claimed invention is not practically applied. Instead, the claimed invention merely *describes* the mathematical operations being performed in the system. *See* Guidelines, Section IV.B.2(c) and (d). The claim should be rejected under 35 U.S.C. § 101.

THE REMAINDER OF THE EXAMINATION MUST BE COMPLETED.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

Example: Matrix

Claim 2

A processing system for modeling space craft thruster operation by performing a plurality of matrix manipulations of terms representing thrust vectors comprising:

- a. means for creating a first R-row by C-column sub matrix of yaw vector components consisting of an offset diagonal of non-zero terms, each of the R-rows having at least N non-zero terms equal in number to C, where C is a prime number and the sum of the non-zero terms of each row is less than C!;
- b. means for creating a second R-row by C-column sub matrix of pitch vector components consisting of an offset diagonal of non-zero terms, each of the R-rows having at least N non-zero terms equal in number to C, where C is a prime number and the sum of the non-zero terms of each row is less than C!;
- c. means for sequentially manipulating the two sub matrices in a manner such that each matrix interleavedly exchanges a row and column until 2R-C exchanges have been made; and
- d. means for matrix multiplying the manipulated matrices; and
- e. means for outputting the result which simulates space craft operation in the yaw and pitch plane of flight.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS**Example: Matrix****Table for Claim 2**

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	NO	GoTo: Q.9	
BOX 9	Q.9. Is claimed invention a product for performing a process?	YES	GoTo: Q.10	
BOX 10	Q.10. Is claimed invention a specific machine or manufacture?	?	GoTo: Q.12a	Note 3
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 4
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	
	Q.13b. Does process solve math problem w/o limitation to a practical application?	NO	GoTo: END	Note 5

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

Example: Matrix

Table Notes for Claim 2

Note 1: Disclosed invention aids pilots of a space craft in controlling the craft.

Note 2: Disclosed invention uses a computer system to determine the coordinates needed for controlling a space craft.

Note 3: Without a specification, it cannot be determined whether the claimed invention is a specific machine. The means-plus-function limitations must be read in light of the structure disclosed in the specification.

If the claimed invention encompasses any and every machine embodiment of the underlying process, then whether the claimed invention is statutory will be decided in the steps below, *i.e.*, boxes 12 and 13 of the flowchart.

Note 4: Element e. is not a physical act performed *outside* the computer system. *See* Guidelines, Section IV.B.2(b)(I).

Note 5: Claimed invention is limited to the practical application of simulating space craft operation in the yaw and pitch plane of flight. The preamble of the claim states that the "processing system" is "for modeling space craft thruster operation." Thus, the "which simulates" clause of element e. (means for outputting) is not a statement of intended use. Rather, it limits the claim to the practical application of modeling space craft thruster operation in the yaw and pitch plane of flight.
THE REMAINDER OF THE EXAMINATION MUST BE COMPLETED.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

Example: Matrix

Claim 3

A processing system for modeling space craft thruster operation to aid pilots in control of the vehicle by performing a plurality of matrix manipulations of terms representing thrust vectors comprising:

- a. means for creating a first R-row by C-column sub matrix of yaw vector components consisting of an offset diagonal of non-zero terms, each of the R-rows having at least N non-zero terms equal in number to C, where C is a prime number and the sum of the non-zero terms of each row is less than C!;
- b. means for creating a second R-row by C-column sub matrix of pitch vector components consisting of an offset diagonal of non-zero terms, each of the R-rows having at least N non-zero terms equal in number to C, where C is a prime number and the sum of the non-zero terms of each row is less than C!;
- c. means for sequentially manipulating the two sub matrices in a manner such that each matrix interleavedly exchanges a row and column until 2R-C exchanges have been made; and
- d. means for matrix multiplying the manipulated matrices; and
- e. means for outputting the result on a display which provides various space craft flight paths with appropriate time requirements and fuel expenditures for each flight path selected in the yaw and pitch plane of flight,

whereby the pilot of a space craft may select a maneuver appropriate for the mission of the space craft.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS**Example: Matrix****Table for Claim 3**

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	NO	GoTo: Q.12	
BOX 9	Q.9. Is claimed invention a product for performing a process?	YES	GoTo:	
BOX 10	Q.10. Is claimed invention a specific machine or manufacture?	?	GoTo:	Note 3
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 4
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	
	Q.13b. Does process solve math problem w/o limitation to a practical application?	NO	GoTo: END	Note 5

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

Example: Matrix

Table Notes for Claim 3

Note 1: Disclosed invention aids pilots of a space craft in controlling the craft.

Note 2: Disclosed invention uses a computer system to determine the coordinates needed for controlling a space craft.

Note 3: Without a specification, it cannot be determined whether the claimed invention is a specific machine. The means-plus-function limitations must be read in light of the structure disclosed in the specification.

If the claimed invention encompasses any and every machine embodiment of the underlying process, then whether the claimed invention is statutory will be decided in the steps below, *i.e.*, boxes 12 and 13 of the flowchart.

Note 4: Element e. is not a physical act performed *outside* the computer system. *See* Guidelines, Section IV.B.2(b)(I).

Note 5: Claimed invention is limited to the practical application of displaying various space craft flight paths for pilot maneuver selection. Knowledge of flight paths and fuel expenditures via the display have real world value and provide immediate benefit. *See* Guidelines, Section IV.2(d)(iii).

THE REMAINDER OF THE EXAMINATION MUST BE COMPLETED.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 1

Claim 1

1. A method for analyzing a plurality of sets of values associated with a plurality of genes to identify genes whose associated values differ by an amount of statistical significance among the sets, said associated values comprising levels of mRNA or protein, said associated values acquired by a process where biological samples containing said plurality of genes are hybridized to one or more microarrays of probes, thus measuring the levels of mRNA or protein in the biological samples, wherein the method comprises:

providing for each of the plurality of genes a parameter that contains information concerning differences in the associated values of that gene among the sets;

adjusting the parameters of the plurality of genes so that variables related to the parameters are substantially independent of variations of scatter values or average associated values of the genes over the sets, said scatter values defined by the standard deviation of the associated values in the sets;

deriving an observed value and an expected value of the adjusted parameter for each gene from the sets of associated values, said expected value being indicative of the extent of variations in the adjusted parameter introduced by the process;

comparing the observed and expected values of the parameter to identify genes whose associated values differ by an amount of statistical significance among the sets; and

providing a list of genes whose associated values differ by an amount of statistical significance among the sets.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS**APPLIED TO INSTANT CLAIM 1****Table for Claim 1**

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	NO	GoTo: Q.9	
BOX 9	Q.9. Is claimed invention a product for performing a process?	NO	GoTo: Q.12a	
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 3
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	Note 4
	Q.13b. Does process solve math problem w/o limitation to a practical application?	NO	GoTo: END	

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 1

Table Notes for Claim 1

Note 1: Disclosed invention aids in analyzing and identifying genes.

Note 2: Disclosed invention uses a computer system to analyze and identify genes.

Note 3: The step of providing a list of genes is not a physical act performed *outside* the computer system. *See* 1996 Guidelines, Section IV.B.2(b)(I).

Note 4: Claimed invention is limited to the practical application of analyzing values representing levels of mRNA or protein acquired by hybridizing genes to a microarray of probes and providing a list of selected genes. The list of selected genes is those which have statistical significance in their expression or other biological characteristic as tested by the microarray.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 28

Claim 28

28. A method for analyzing a plurality of original sets of values associated with a plurality of genes to identify genes whose associated values differ by an amount of statistical significance among the sets, said associated values comprising levels of mRNA or protein, said associated values acquired by a process where biological samples containing said plurality of genes are hybridized to one or more microarrays of probes, thus measuring the levels of mRNA or protein in the biological samples, wherein the method comprises:

calculating for each of the plurality of genes a value for a statistical parameter indicating differences between associated values of such gene among the original sets;

ranking the values of the parameter of the genes;

providing an expected value of such parameter for each rank, wherein said providing includes permuting the associated values in the original sets to arrive at sets different from the original sets for each permutation, deriving a value of such parameter for each permutation, and ranking such values, said expected value for each rank being indicative of the extent of variations in the parameter for parameters in said rank introduced by the process;

comparing the calculated and expected values for the parameter of the same rank to identify genes whose associated values differ by an amount of statistical significance among the sets; and

providing a list of genes whose associated values differ by an amount of statistical significance among the sets.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

APPLIED TO INSTANT CLAIM 28

Table for Claim 28

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	NO	GoTo: Q.9	
BOX 9	Q.9. Is claimed invention a product for performing a process?	NO	GoTo: Q.12a	
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 3
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	
	Q.13b. Does process solve math problem w/o limitation to a practical application?	NO	GoTo: END	Note 4

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 28

Table Notes for Claim 28

Note 1: Disclosed invention aids in analyzing and identifying genes.

Note 2: Disclosed invention uses a computer system to analyze and identify genes.

Note 3: The step of providing a list of genes is not a physical act performed *outside* the computer system. *See* 1996 Guidelines, Section IV.B.2(b)(I).

Note 4: Claimed invention is limited to the practical application of analyzing values representing levels of mRNA or protein acquired by hybridizing genes to a microarray of probes and providing a list of selected genes. The list of selected genes is those which have statistical significance in their expression or other biological characteristic as tested by the microarray.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 58

Claim 58

58. A computer system for analyzing a plurality of sets of values associated with a plurality of genes to identify genes whose associated values differ by an amount of statistical significance among the sets, said associated values comprising levels of mRNA or protein, said associated values acquired by a process where biological samples containing said plurality of genes are hybridized to one or more microarrays of probes, thus measuring the levels of mRNA or protein in the biological samples, wherein the system comprises:

one or more computers;

one or more computer programs running on the computer(s), performing the following:

providing for each of the plurality of genes a parameter that contains information concerning differences in the associated values of that gene among the sets;

adjusting the parameters of the plurality of genes so that variables related to the parameters are substantially independent of variations in scatter values or average associated values of the genes over the sets, said scatter values defined by standard deviation of the associated values in the sets;

deriving an observed value and an expected value of the adjusted parameter for each gene from the sets of associated values, said expected value being indicative of the extent of variations in the adjusted parameter introduced by the process;

comparing the observed and expected values of the parameter to identify genes whose associated values differ by an amount of statistical significance among the sets; and

providing a list of genes whose associated values differ by an amount of statistical significance among the sets.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

APPLIED TO INSTANT CLAIM 58

Table for Claim 58

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	YES	GoTo: Q.12a	
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 3
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	
	Q.13b. Does process solve math problem w/o limitation to a practical application?	NO	GoTo: END	Note 4

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 58

Table Notes for Claim 58

Note 1: Disclosed invention aids in analyzing and identifying genes.

Note 2: Disclosed invention uses a computer system to analyze and identify genes.

Note 3: The step of providing a list of genes is not a physical act performed *outside* the computer system. *See* 1996 Guidelines, Section IV.B.2(b)(I).

Note 4: Claimed invention is limited to the practical application of analyzing values representing levels of mRNA or protein acquired by hybridizing genes to a microarray of probes and providing a list of selected genes. The list of selected genes is those which have statistical significance in their expression or other biological characteristic as tested by the microarray.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 60

Claim 60

60. A computer system for analyzing a plurality of original sets of values associated with a plurality of genes to identify genes whose associated values differ by an amount of statistical significance among the sets, said associated values comprising levels of mRNA or protein, said associated values acquired by a process where biological samples containing said plurality of genes are hybridized to one or more microarrays of probes, thus measuring the levels of mRNA or protein in the biological samples, wherein the system comprises:

one or more computers;

one or more computer programs running on the computer(s), performing the following:

calculating for each gene a value for a statistical parameter indicating differences between associated values of such gene among the original sets;

ranking the values of the parameter of the genes;

providing an expected value of such parameter for each rank, wherein said providing includes permuting the associated values in the original sets to arrive at sets different from the original sets for each permutation, deriving a value of such parameter for each permutation, and ranking such values, said expected value for each rank being indicative of the extent of variations in the parameter for parameters in said rank introduced by the process;

comparing the calculated and expected values for the parameter of the same rank to identify genes whose associated values differ by an amount of statistical significance among the sets; and

providing a list of genes whose associated values differ by an amount of statistical significance among the sets.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

APPLIED TO INSTANT CLAIM 60

Table for Claim 60

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	YES	GoTo: Q.12a	
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 3
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	Note 4
	Q.13b. Does process solve math problem w/o limitation to a practical application?	NO	GoTo: END	

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 60

Table Notes for Claim 60

Note 1: Disclosed invention aids in analyzing and identifying genes.

Note 2: Disclosed invention uses a computer system to analyze and identify genes.

Note 3: The step of providing a list of genes is not a physical act performed *outside* the computer system. *See* 1996 Guidelines, Section IV.B.2(b)(I).

Note 4: Claimed invention is limited to the practical application of analyzing values representing levels of mRNA or protein acquired by hybridizing genes to a microarray of probes and providing a list of selected genes. The list of selected genes is those which have statistical significance in their expression or other biological characteristic as tested by the microarray.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS

APPLIED TO INSTANT CLAIM 65

Claim 65

65. A method for analyzing a plurality of sets of values associated with a plurality of genes to identify genes whose associated values differ by an amount of statistical significance among the sets, said associated values comprising levels of mRNA or protein, said associated values acquired by a process where biological samples containing said plurality of genes are hybridized to one or more microarrays of probes, thus measuring the levels of mRNA or protein in the biological samples, wherein the method comprises:

measuring samples to obtain the associated values of the plurality of genes;

providing for each of the plurality of genes a parameter that contains information concerning differences in the associated values of that gene among the sets;

adjusting the parameters of the plurality of genes so that variables related to the parameters are substantially independent of variations in scatter values or average associated values of the genes over the sets, said scatter values defined by standard deviation of the associated values in the sets;

deriving an observed value and an expected value of the adjusted parameter for each gene from the sets of associated values, said expected value being indicative of the extent of variations in the adjusted parameter introduced by the process;

comparing the observed and expected values of the parameter to identify genes whose associated values differ by an amount of statistical significance among the sets; and

identifying from the plurality of genes those whose associated values differ by an amount of statistical significance among the sets.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS**APPLIED TO INSTANT CLAIM 65****Table for Claim 65**

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	NO	GoTo: Q.9	
BOX 9	Q.9. Is claimed invention a product for performing a process?	NO	GoTo: Q.12	
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 3
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	
	Q.13b. Does process solve math problem w/o limitation to a practical application?	NO	GoTo: END	Note 4

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 65

Table Notes for Claim 65

Note 1: Disclosed invention aids in analyzing and identifying genes.

Note 2: Disclosed invention uses a computer system to analyze and identify genes.

Note 3: The step of identifying genes is not a physical act performed *outside* the computer system. *See* 1996 Guidelines, Section IV.B.2(b)(I).

Note 4: Claimed invention is limited to the practical application of analyzing values representing levels of mRNA or protein acquired by hybridizing genes to a microarray of probes and identifying selected genes. The identified genes are those which have statistical significance in their expression or other biological characteristic as tested by the microarray.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 66

Claim 66

66. A method for analyzing a plurality of original sets of values associated with a plurality of genes to identify genes whose associated values differ by an amount of statistical significance among the sets, said associated values comprising levels of mRNA or protein, said associated values acquired by a process where biological samples containing said plurality of genes are hybridized to one or more microarrays of probes, thus measuring the levels of mRNA or protein in the biological samples, wherein the method comprises:

- measuring samples to obtain the associated values of the plurality of genes;
- calculating for each of the plurality of gene a value for a statistical parameter indicating differences between associated values of such gene among the original sets;
- ranking the values of the parameter of the genes ;
- providing an expected value of such parameter for each rank, wherein said providing includes permuting the associated values in the original sets to arrive at sets different from the original sets for each permutation, deriving a value of such parameter for each permutation, and ranking such values, said expected value for each rank being indicative of the extent of variations in the parameter for parameters in said rank introduced by the process;
- comparing the calculated and expected values for the parameter of the same rank to identify genes whose associated values differ by an amount of statistical significance among the sets; and
- identifying from the plurality of genes those whose associated values differ by an amount of statistical significance among the sets.

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS**APPLIED TO INSTANT CLAIM 66****Table for Claim 66**

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	NO	GoTo: Q.9	
BOX 9	Q.9. Is claimed invention a product for performing a process?	NO	GoTo: Q.12	
BOX 12	Q.12a. Does process have post-computer process activity?	NO	GoTo: Q.12b	Note 3
	Q.12b. Does process have pre-computer process activity?	NO	GoTo: Q.13a	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?	NO	GoTo: Q.13b	
	Q.13b. Does process solve math problem w/o limitation to a practical application?	NO	GoTo: END	Note 4

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
APPLIED TO INSTANT CLAIM 66

Table Notes for Claim 66

Note 1: Disclosed invention aids in analyzing and identifying genes.

Note 2: Disclosed invention uses a computer system to analyze and identify genes.

Note 3: The step of identifying genes is not a physical act performed *outside* the computer system. *See* 1996 Guidelines, Section IV.B.2(b)(I).

Note 4: Claimed invention is limited to the practical application of analyzing values representing levels of mRNA or protein acquired by hybridizing genes to a microarray of probes and identifying selected genes. The identified genes are those which have statistical significance in their expression or other biological characteristic as tested by the microarray.